WILDLIFE ECOLOGY TEAM
WILDLIFE HABITAT RELATIONSHIPS
IN WASHINGTON AND OREGON
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Title:

Demographic characteristics of spotted owls in the Oregon Coast Ranges, 1990–2015.

Principal Investigator and Organizations:

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Study Objective:

The study objective was to elucidate the population ecology of the spotted owl in the Oregon Coast Ranges, to include age and sex specific birth and death rates, and population trend estimates.

Potential Benefit or Utility of the Study:

Information on the demography of spotted owl populations is used to estimate population trends and assess the effects of different management strategies on spotted owls. This study provides data that we use to estimate survival, reproduction, and population parameters of spotted owls relative to landscape features in the Oregon Coast Ranges.

Research Accomplishments:

Study Area and Methods

The study area is located in the Oregon Coast Ranges, principally on public forest lands administered by the Siuslaw National Forest and the Salem and Eugene Districts of the Bureau of Land Management (Fig. 1).

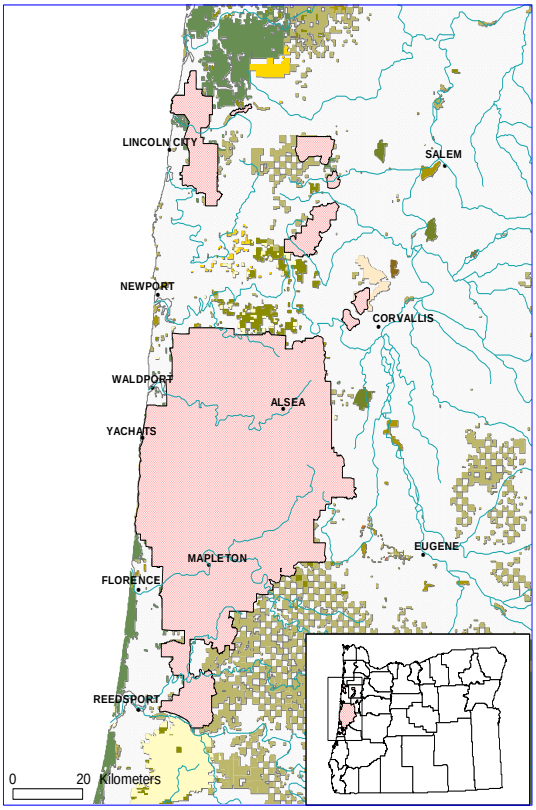

Figure 1. Oregon Coast Ranges spotted owl study area.

Municipal, state, and private timberlands are interspersed among the federal lands. Within the study area we visited 172 continuously-monitored spotted owl sites in 2015 to determine residency, nesting status, and reproductive success of all spotted owls detected. We monitored 2 additional sites where spotted owls were initially detected while surveying adjacent demography sites or that were known from previous years.

Number of Sites Where Spotted Owls Were Detected

The effort to locate, band, and monitor owls consisted of a combination of surveys conducted by us and cooperators from the Bureau of Land Management, private consulting firms, and timber companies. In 2015, we detected owls at 41 of the 172 sites surveyed (Fig. 2, Appendix A). Owls were detected at 48 sites in 2014 (Fig. 2, Appendix A). We detected 65 non-juvenile spotted owls on the study area. Three of these owls were “extra” individuals detected at sites where another owl of the same sex had already been identified. Additional same-sex owl observations have been a feature of all previous seasons except 1996 and 2011 (Appendix A). No subadult owls were detected on the study area in 2015. One subadult male was detected in 2014, but observations of subadults have been rare in recent years (Appendix C). In 2015, the number of sites with resident pairs was 18, a decrease from the count of 30 pairs in 2015 (Fig. 2, Appendix A). We detected single owls at 20 sites (excluding additional owls), an increase from 16 sites in 2014. Male and female spotted owls were detected at 3 sites where pair status was not determined to protocol.

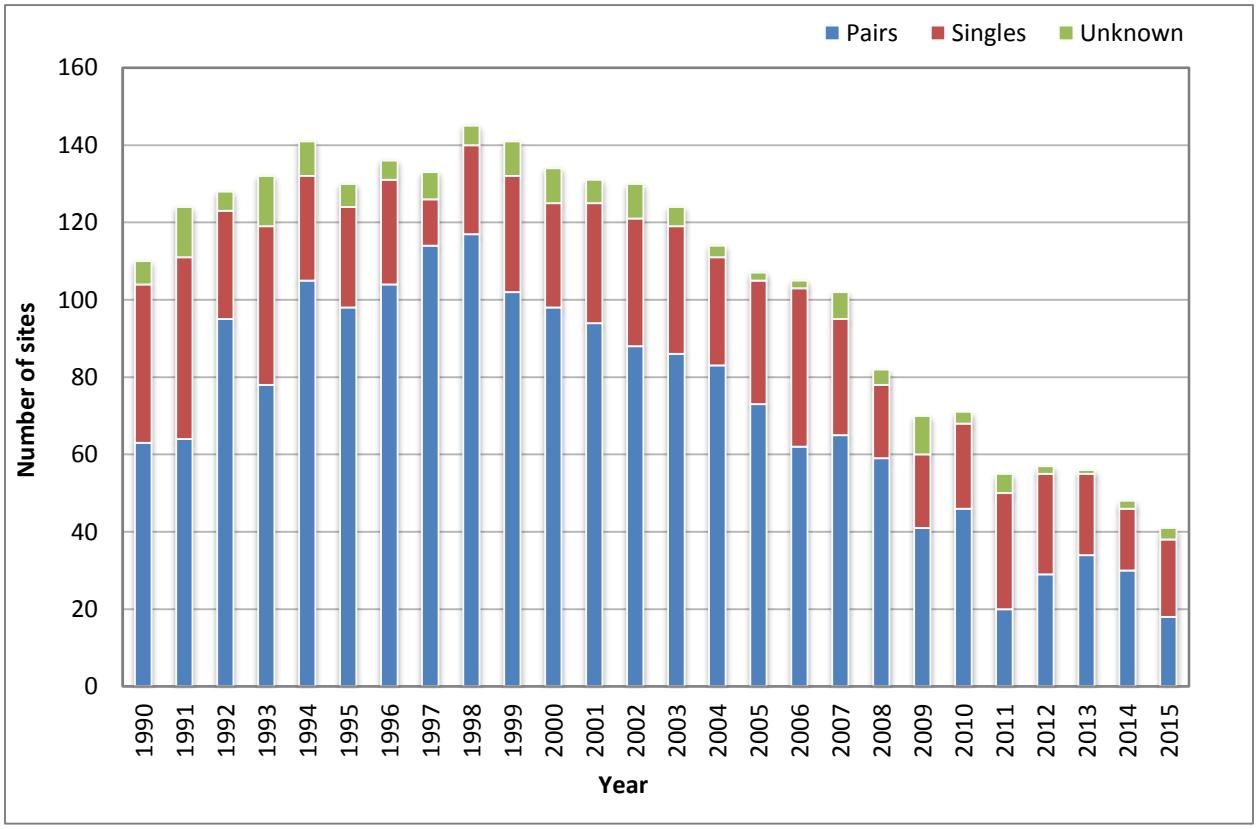

Figure 2. Number of sites where spotted owl pairs, singles, or males and females of unknown status were detected on the Oregon Coast Ranges Study Area, 1990–2015.

Proportion of Sites Where Spotted Owls Were Detected

The percent of sites in which a spotted owl was detected has gradually declined over the course of the study from a high of 88 percent in 1991 to a low of 24 percent in 2015. This was a decrease in 2015, from 28 percent in 2014 (Fig. 3, Appendix A). In 2015, pairs were observed at 10 percent of the sites, down from 17 percent in 2014. Single owls were observed at 12 percent of the sites surveyed. In 2015, there were 3 sites (2% of total) where both a male and female were detected, but pair status was not established (Fig. 3, Appendix A).

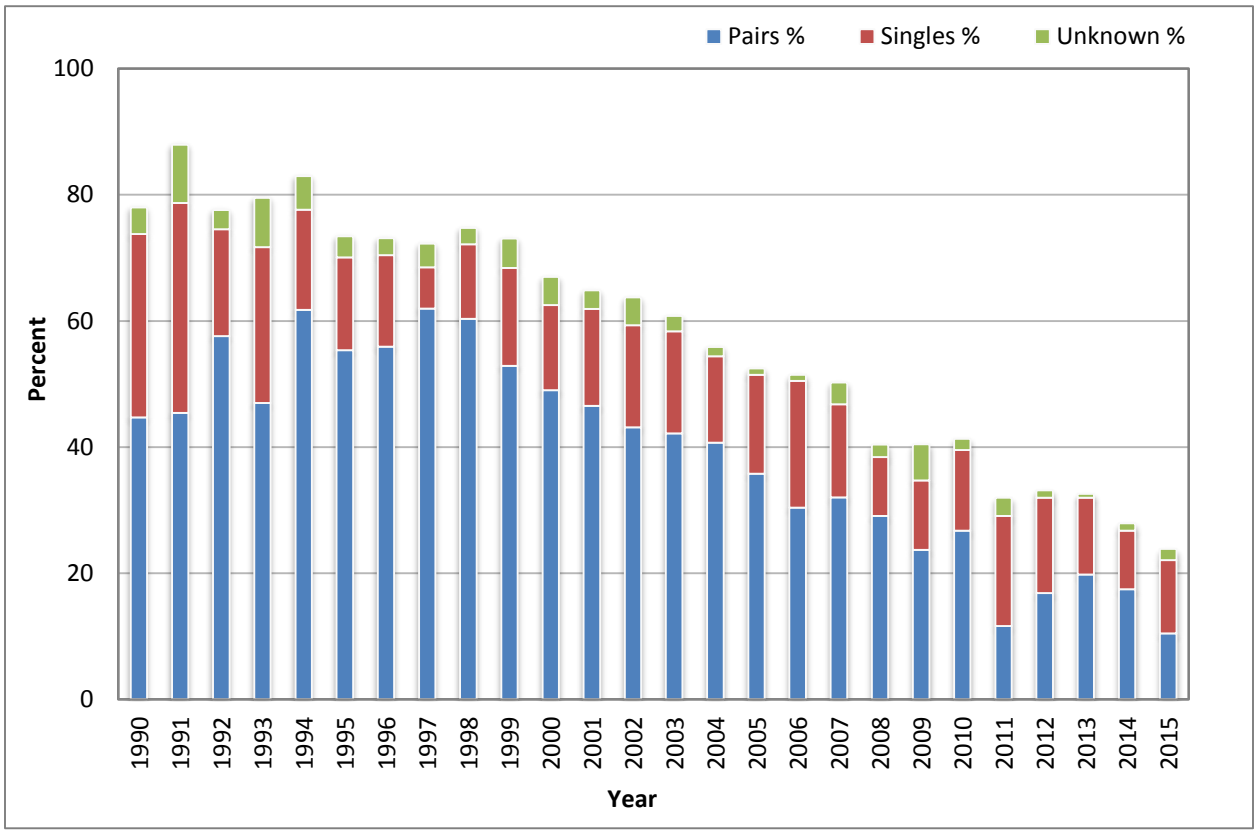

Figure 3. Percent of sites where spotted owl pairs, singles, or males and females of unknown status were detected on the Oregon Coast Ranges Study Area, 1990–2015.

Number of Owls Marked

We banded 337 adult, 78 subadult, and 776 juvenile spotted owls on the study area from 1990-2015 (Appendix B). In 2015, we banded 8 juvenile spotted owls on the study area. We encountered one unbanded adult male late in the season, but the owl was not relocated during a subsequent banding attempt. Two adult females were recaptured on the study area. Both of these females were immigrants; one was originally banded as a juvenile on the Tyee demography study area, the other had been previously marked as an adult on the Elliot State Forest. We also recaptured one adult female on a site adjacent to our demographic study area.

Emigration and Immigration

We observed 17 owls that dispersed to new sites within the study area in 2014. Thirteen of these movements were breeding dispersals of owls most recently observed elsewhere on the study area as non-juveniles (between-site movements). Three additional breeding dispersals documented were cases of immigration. These three owls were most recently observed at sites on lands adjoining our demographic study area, including the Elliot State Forest, and BLM (Eugene District). We observed only one case of natal dispersal on the study area in 2015. This owl was originally marked as a juvenile on the Tyee demographic study area to the southeast, and was a case of immigration. Overall, we observed 4 cases of immigration in 2015.

We documented an additional 2 dispersals at sites adjacent to the demography study area. One of these was a natal dispersal of an owl banded as juvenile in previous years on the demography study area, and was a case of emigration. The other case was a breeding dispersal of an owl most recently observed on the demographic study area, and was also an emigration. A total of 2 cases of emigration were observed in 2015.

Barred Owl Detections

The proportion of sites where at least one barred owl was detected within 1.6 km of the year-specific spotted owl activity center has generally increased throughout the duration

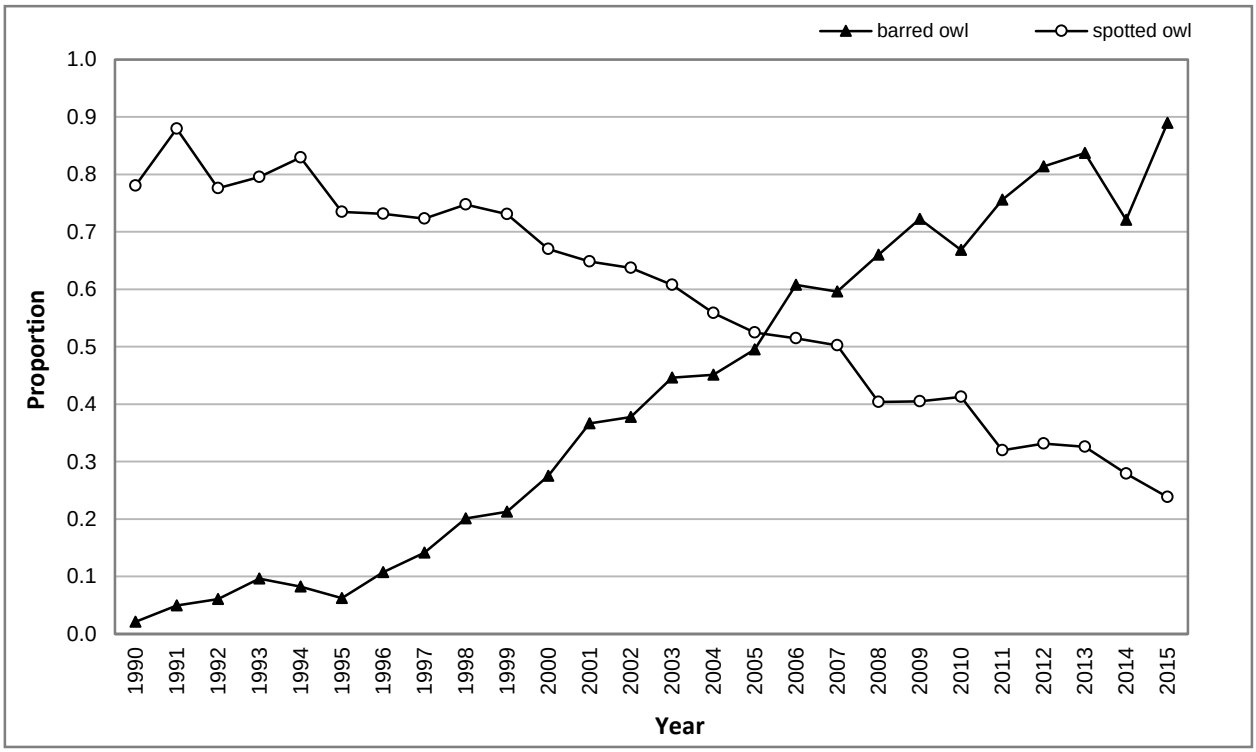

Figure 4. Proportion of spotted owl sites in which barred owls and spotted owls were detected on the Oregon Coast Ranges Study Area, 1990–2015.

of the study, suggesting a steady increase in the barred owl population (Fig. 4, Appendix A). We detected barred owls at 89% of the territories in 2015. This was an increase from 72% in 2014, which had been slightly below detection levels in the immediately preceding years 2011-2013 (Fig. 4). Our survey methods probably underestimated the number of sites with barred owls because we did not specifically target barred owls during our surveys of spotted owls. The overall increase in the proportion of territories where barred owls were detected is likely due to an increase in barred owl numbers, as well as increased nighttime survey effort at sites where spotted owls have disappeared (Fig. 5). The proportion of total survey time that included surveys at night had more than doubled from 0.38 in 1990 to 0.78 in 2013 (Fig. 5).

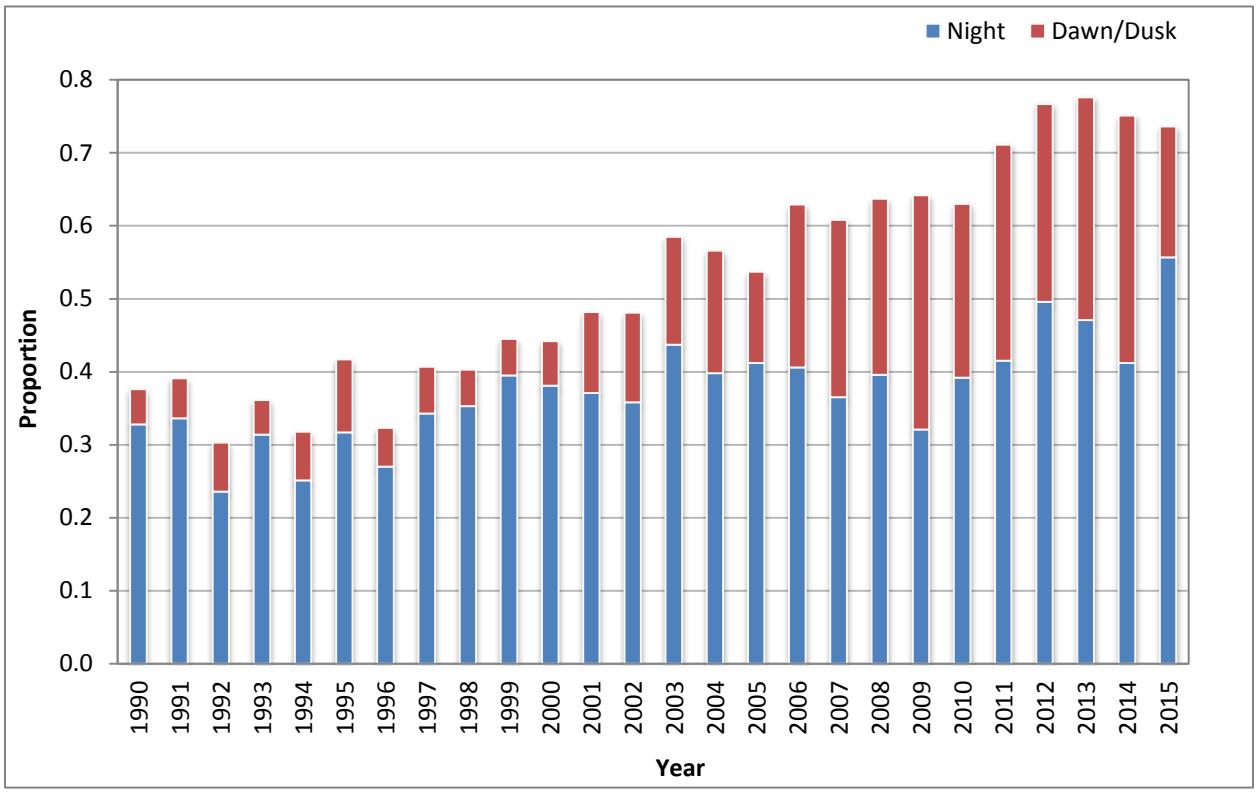

Figure 5. Proportion of survey effort conducted at night and dawn or dusk on the Oregon Coast Ranges Study Area, 1990–2015.

Sex Ratio

Over the course of the study, we have consistently observed a slightly greater proportion of males to females in the territorial population, except in 2014, when we observed a slightly greater proportion of females for the first time. In 2015 we detected 33 males, 32 females, with a 0.02 proportional difference (Appendix C). The mean difference in the annual proportions of known sex owls detected on the study area in 1990–2015 was 0.07 (SE= 0.01; annual range = 0.01–0.18). We suspect that the disproportionate number of males detected in most years is due to sexual differences in detectability rather than a real difference in the population, but this has not been tested.

Reproduction

Of 22 females that met protocols for determination of nesting status in 2015, 5 (23%) attempted to nest and 4 (80%) successfully fledged young.(Appendix D, F). Of 23 females that met protocols for reproductive status, 4 (17%) produced young (Appendix E). The total number of young produced by the 4 females that produced young was 8 and the mean brood size for those 4 females was 2.00 (SE= 0.00; Appendix H). The mean estimate of number of young fledged for all females detected in 2015 was 0.35 (SE= 0.16; Fig. 6, Appendix G), which was slightly below the average for all years in the study (Fig. 6, Appendix G).

During the first decade of this study, nesting and reproductive estimates followed a cyclic biennial pattern with higher reproduction in even-numbered years. This pattern was not apparent during the latter decade of the study, during which high, low, and intermediate annual reproductive estimates occurred in both odd and even years (Fig. 6, Appendices D–H).

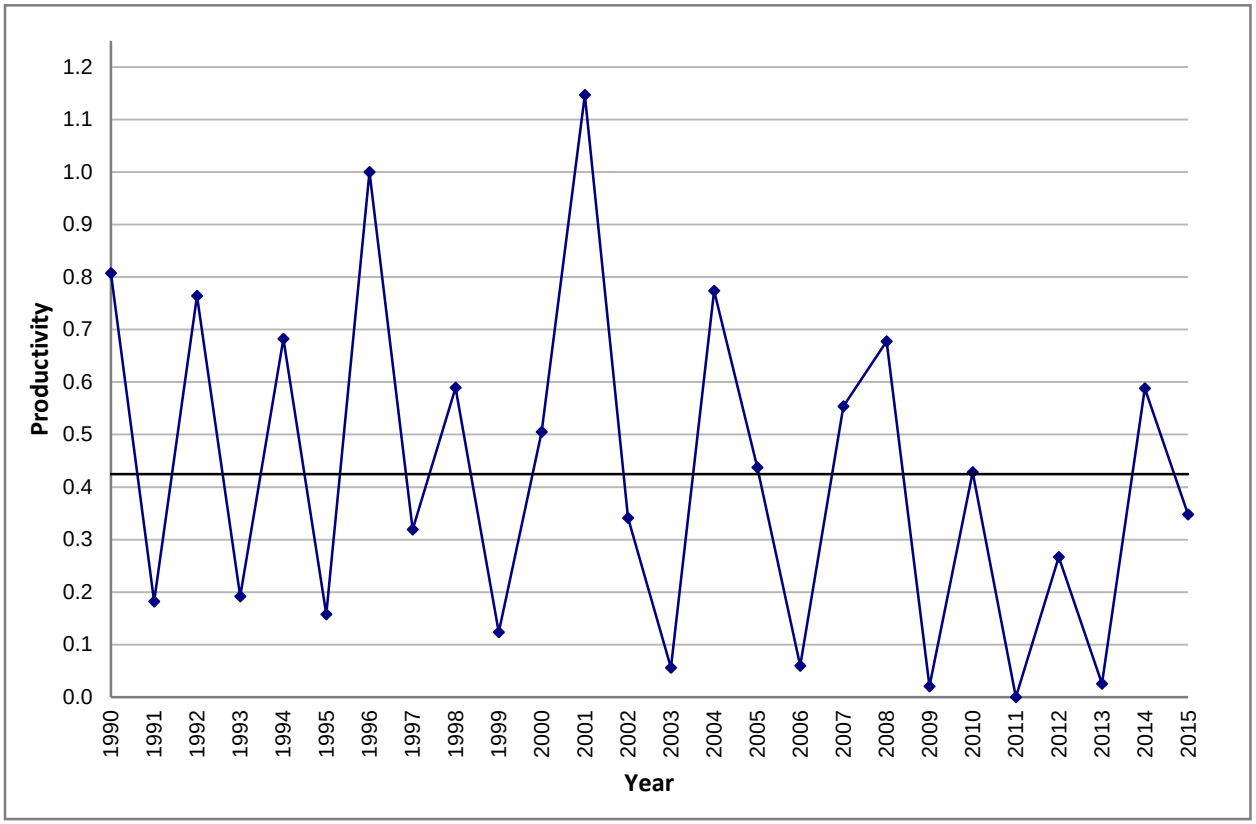

Figure 6. Estimated annual productivity (mean number of young fledged) of female spotted owls on the Oregon Coast Ranges Study Area, 1990-2015. Horizontal line indicates the mean of yearly means (0.42 ± 0.06 SE).

Two well-developed juveniles from the Baldy Mountain tract, south half Mapleton Ranger District, Siuslaw National Forest. 7/3/2014.

Problems Encountered:

Road closures and a reduction in forest road maintenance have greatly restricted access and resulted in considerable increase in the number of areas that need to be accessed on foot. Diminished access has led to increased survey times. In addition, the gradual reduction in sites occupied by spotted owls means that we now have to spend much more time conducting night surveys at historical sites where it used to be easy to locate spotted owls during diurnal visits. This situation is not likely to change in the foreseeable future.

Research Plans for FY 16:

a. Continue demographic study with field work beginning in March 2016.

Publications and Technology Transfer Activities:

a. Conducted field trips with university students and professional organizations.

b. Provided demographic data to federal, state, and private organizations for their

management activities.

c. Provided detailed summary information regarding survey results and territory status determinations to the Siuslaw National Forest and the Eugene, Coos Bay, and Salem Districts of the Bureau of Land Management.

d. Provided updates regarding the current occupancy and reproductive status of owl territories to Oregon Department of Forestry.

e. Participated in meta-analysis workshop January 2014. Results published in The Condor: Ornithological Applications 118: 57-116, 2016.

f. Provided demographic data, mapping resources, and other supporting information to USGS in association with a barred owl study beginning in 2015.

Duration of Study:

a. Initiated in FY1990.

b. Contingent upon future funding. Currently funded through FY 2016.

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Appendix A. Historic spotted owl sites surveyed per year and the number of these with spotted owl pairs, spotted owl singles, unknown status spotted owls, hybrid owls, mixed species pairs, and barred owls in the Oregon Coast Ranges Study Area, 1990–2015. Additional same-sex individuals at a territory were excluded from the counts of pairs, singles, and unknown status owls.

Year	Sites Surveyed	Pairs[1]	Singles[2]	Unknown status[3]	Additional owls[4]	Additional owl sites	Hybrid owls[5]	Mixed spp. pairs[6]	Spotted owl sites	Barred owl sites[7]
1990	141	63	41	6	6	6	0	0	110	3
1991	141	64	47	13	9	8	0	0	124	7
1992	165	95	28	5	8	7	0	0	128	10
1993	166	78	41	13	2	2	0	0	132	16
1994	170	105	27	9	5	5	0	1	141	14
1995	177	98	26	6	2	2	0	0	130	11
1996	186	104	27	5	0	0	0	2	136	20
1997	184	114	12	7	4	3	0	1	133	26
1998	194	117	23	5	5	5	1	1	145	39
1999	193	102	30	9	5	5	1	1	141	41
2000	200	98	27	9	7	7	1	1	134	55
2001	202	94	31	6	3	3	0	0	131	74
2002	204	88	33	9	5	5	0	0	130	77
2003	204	86	33	5	8	7	1	0	124	91
2004	204	83	28	3	10	8	2	2	114	92
2005	204	73	32	2	3	3	1	1	107	101
2006	204	62	41	2	2	2	3	2	105	124
2007	203	65	30	7	7	6	0	0	102	121
2008	203	59	19	4	1	1	1	1	82	134
2009	173	41	19	10	3	3	2	2	70	125
2010	172	46	22	3	2	2	1	1	71	115
2011	172	20	30	5	0	0	1	0	55	130
2012	172	29	26	2	2	2	1	0	57	140
2013	172	34	21	1	3	3	0	0	56	144
2014	172	30	16	2	4	4	2	0	48	124
2015	172	18	20	3	3	3	0	0	41	153

[1]Sites in which a spotted owl pair was present. Spotted owls paired with barred owls or hybrid owls were categorized as singles (9 cases over all years).

[2]Sites in which a single spotted owl was present. If more than a single spotted owl was detected but the birds were of the same sex, it was classified as a single territory.

[3]Unknown status sites had detections of both a male and a female spotted owl, but the birds did not meet pair status.

[4]Additional owls were cases in which more than a single spotted owl of the same sex was detected.

[5]Hybrid owls were considered present if they were detected within the site boundary. Cases include: single hybrid owls (5), hybrid males at a territory occupied by a spotted owl (2), spotted owls paired with hybrid owls (4), hybrid owls paired with barred owls (5); a hybrid male paired with a barred owl at a territory occupied by a spotted owl (2).

[6]Mixed species pairs included territories in which at least one of the birds had some spotted owl ancestry and it was not a straight-forward spotted owl pair (e.g., spotted owl–hybrid owl, hybrid–barred owl, spotted owl–barred owl, etc.), but pair status was established to protocol (16 cases over all years).

[7]Barred owls were considered present if one was detected within 1.6 km of the most recent preceding spotted owl annual activity center.

Appendix B. Number of spotted owls banded on the Oregon Coast Ranges Study Area, 1990–2015.

	Adults		Subadults		
Year	Males	Females	Males	Females	Juveniles
1990	43	31	8	3	32
1991	25	23	2	4	7
1992	28	30	4	4	61
1993	6	8	2	0	13
1994	15	18	3	1	62
1995	5	8	1	2	13
1996	7	1	4	4	100
1997	3	7	4	0	36
1998	2	2	5	1	57
1999	3	5	1	1	10
2000	4	9	1	0	51
2001	1	1	0	3	99
2002	4	1	2	3	28
2003	2	1	1	2	5
2004	4	1	0	2	59
2005	3	2	1	0	24
2006	1	4	1	2	2
2007	3	3	0	0	31
2008	3	2	0	0	36
2009	2	1	3	0	1
2010	1	0	1	1	15
2011	2	1	0	0	0
2012	4	1	0	0	7
2013	1	2	0	0	1
2014	1	2	1	0	18
2015	0	0	0	0	8
Total	173	164	45	33	776

Appendix C. Number of spotted owls detected on historic sites in the Oregon Coast Ranges Study Area, 1990–2015.

	Adults		Subadults		Age unk			
Year	Males	Females	Males	Females	Males	Females	Sex Unk	Juveniles
1990	55	41	10	4	35	28	12	40
1991	78	57	7	4	38	25	1	10
1992	92	87	6	7	19	18	7	69
1993	85	79	5	0	35	19	2	14
1994	99	101	14	8	23	13	2	71
1995	110	97	3	3	16	7	0	15
1996	109	94	9	11	12	10	1	107
1997	116	111	9	6	6	9	1	37
1998	116	107	16	10	13	10	0	68
1999	116	105	3	5	15	8	5	13
2000	118	102	5	4	11	6	2	51
2001	107	88	3	4	17	12	3	109
2002	94	78	7	10	26	14	3	31
2003	96	82	7	7	22	5	4	5
2004	91	84	1	4	16	11	3	65
2005	74	76	6	5	11	9	4	32
2006	70	64	2	3	17	10	5	2
2007	71	63	1	2	17	18	9	33
2008	62	53	1	2	15	12	1	38
2009	45	46	3	1	12	12	5	1
2010	47	45	4	1	13	8	4	19
2011	25	24	0	0	15	12	4	0
2012	36	32	0	0	14	4	4	8
2013	42	38	0	0	6	6	2	1
2014	32	37	1	0	8	6	0	21
2015	25	27	0	0	8	5	0	8

Appendix D. Proportion of female spotted owls that nested on the Oregon Coast Ranges Study, 1990–2015. Estimates were calculated for paired or single females whose nesting status was determined by 1 June.

	n			Nesting Adults		Nesting Subadults		Combined	
Year	Adults	Subadults	Unk	Prop.	95% *CI*.	Prop.	95% *CI*.	Prop.	95% *CI*
1990	20	2	7	0.90	0.68-0.99	0.50	0.01-0.99	0.83	0.64-0.94
1991	37	1	0	0.16	0.06-0.32	0.00	0.00-0.98	0.16	0.06-0.31
1992	66	6	4	0.71	0.59-0.82	0.50	0.12-0.88	0.68	0.57-0.79
1993	66	0	2	0.24	0.15-0.36	——	————	0.25	0.15-0.37
1994	84	5	2	0.68	0.57-0.78	0.40	0.05-0.85	0.65	0.54-0.75
1995	84	3	0	0.17	0.09-0.26	0.00	0.00-0.71	0.16	0.09-0.26
1996	84	8	3	0.82	0.72-0.90	0.63	0.24-0.91	0.80	0.71-0.88
1997	100	6	0	0.42	0.32-0.52	0.00	0.00-0.46	0.40	0.30-0.50
1998	96	8	3	0.61	0.51-0.71	0.25	0.03-0.65	0.60	0.50-0.69
1999	91	2	1	0.18	0.10-0.27	0.00	0.00-0.84	0.17	0.10-0.26
2000	85	2	0	0.54	0.43-0.65	0.50	0.01-0.99	0.54	0.43-0.65
2001	75	2	2	0.87	0.77-0.93	0.00	0.00-0.84	0.85	0.75-0.92
2002	64	8	4	0.55	0.42-0.67	0.00	0.00-0.37	0.49	0.37-0.60
2003	64	5	0	0.06	0.02-0.15	0.00	0.00-0.52	0.06	0.02-0.14
2004	66	2	2	0.79	0.67-0.88	0.50	0.01-0.99	0.79	0.67-0.87
2005	71	4	1	0.46	0.35-0.59	0.25	0.01-0.81	0.45	0.33-0.57
2006	47	2	1	0.06	0.01-0.18	0.00	0.00-0.84	0.06	0.01-0.17
2007	48	1	0	0.63	0.47-0.76	0.00	0.00-0.98	0.61	0.46-0.75
2008	53	1	4	0.74	0.60-0.85	0.00	0.00-0.98	0.72	0.59-0.83
2009	33	1	0	0.06	0.01-0.20	0.00	0.00-0.98	0.06	0.01-0.20
2010	35	2	0	0.89	0.73-0.97	0.00	0.00-0.84	0.84	0.68-0.94
2011	18	0	0	0.00	0.00-0.19	——	————	0.00	0.00-0.19
2012	27	0	1	0.44	0.25-0.65	——	————	0.43	0.24-0.63
2013	31	0	0	0.10	0.02-0.26	——	————	0.10	0.02-0.26
2014	33	0	0	0.67	0.48-0.82	——	————	0.67	0.48-0.82
2015	21	0	1	0.24	0.08-0.47	——	————	0.23	0.08-0.45
Overall:	1499	71	38	0.48	0.46-0.51	0.23	0.13-0.34	0.48	0.45-0.50

Appendix E. Proportion of female spotted owls that fledged young on the Oregon Coast Ranges Study Area, 1990-2015. Estimates were calculated for paired or single females for which the number of young fledged was determined before 31 August.

	n			Adults		Subadults		Combined	
Year	Adults	Subadults	Unk	Prop.	95% *CI*	Prop.	95% *CI*	Prop.	95% *CI*.
1990	34	4	14	0.71	0.53-0.85	0.50	0.07-0.93	0.62	0.47-0.75
1991	51	2	2	0.12	0.04-0.24	0.00	0.00-0.84	0.13	0.05-0.24
1992	78	7	4	0.54	0.42-0.65	0.14	0.00-0.58	0.48	0.38-0.59
1993	70	0	3	0.11	0.05-0.21	——	————	0.12	0.06-0.22
1994	95	6	3	0.48	0.38-0.59	0.00	0.00-0.46	0.45	0.35-0.55
1995	91	3	1	0.10	0.05-0.18	0.00	0.00-0.71	0.09	0.04-0.17
1996	93	10	6	0.67	0.56-0.76	0.40	0.12-0.74	0.63	0.54-0.72
1997	109	6	1	0.24	0.16-0.33	0.00	0.00-0.46	0.23	0.16-0.32
1998	100	9	3	0.41	0.31-0.51	0.11	0.00-0.48	0.38	0.29-0.47
1999	99	3	3	0.08	0.04-0.15	0.00	0.00-0.71	0.09	0.04-0.16
2000	97	4	0	0.33	0.24-0.43	0.25	0.01-0.81	0.33	0.24-0.43
2001	87	4	4	0.68	0.57-0.77	0.00	0.00-0.60	0.65	0.55-0.75
2002	75	9	4	0.27	0.17-0.38	0.00	0.00-0.34	0.24	0.15-0.34
2003	80	8	1	0.05	0.01-0.12	0.00	0.00-0.37	0.04	0.01-0.11
2004	86	2	5	0.51	0.40-0.62	0.00	0.00-0.84	0.49	0.39-0.60
2005	74	4	2	0.32	0.22-0.44	0.00	0.00-0.60	0.30	0.20-0.41
2006	63	3	1	0.03	0.00-0.11	0.00	0.00-0.71	0.03	0.00-0.10
2007	63	2	0	0.38	0.26-0.51	0.00	0.00-0.84	0.37	0.25-0.50
2008	56	2	4	0.46	0.33-0.60	0.00	0.00-0.84	0.42	0.30-0.55
2009	46	2	0	0.02	0.00-0.12	0.00	0.00-0.84	0.02	0.00-0.11
2010	45	2	2	0.31	0.18-0.47	0.00	0.00-0.84	0.31	0.18-0.45
2011	21	0	0	0.00	0.00-0.16	——	————	0.00	0.00-0.16
2012	29	0	1	0.21	0.08-0.40	——	————	0.20	0.08-0.39
2013	38	0	1	0.03	0.00-0.14	——	————	0.03	0.00-0.13
2014	34	0	0	0.35	0.20-0.54	——	————	0.35	0.20-0.54
2015	22	0	1	0.18	0.05-0.40	——	————	0.17	0.05-0.39
Overall:	1736	92	66	0.31	0.29-0.34	0.10	0.05-0.18	0.30	0.28-0.32

Appendix F. Proportion of nesting female spotted owls that fledged young on the Oregon Coast Ranges Study Area, 1990-2015. Estimates were calculated for paired or single females whose nesting status was determined by 1 June.

	n			Adults		Subadults		Combined	
Year	Adults	Subadults	Unk	Prop.	95% *CI*	Prop.	95% *CI*	Prop.	95% *CI*
1990	17	1	5	0.82	0.57-0.96	1.00	0.03-1.00	0.74	0.52-0.90
1991	6	0	0	0.67	0.22-0.96	——	————	0.67	0.22-0.96
1992	46	3	2	0.85	0.71-0.94	0.33	0.01-0.91	0.78	0.65-0.89
1993	15	0	1	0.53	0.27-0.79	——	————	0.50	0.25-0.75
1994	57	2	0	0.75	0.62-0.86	0.00	0.00-0.84	0.73	0.60-0.84
1995	14	0	0	0.64	0.35-0.87	——	————	0.64	0.35-0.87
1996	69	5	2	0.80	0.68-0.88	0.60	0.15-0.95	0.78	0.67-0.86
1997	42	0	0	0.62	0.46-0.76	——	————	0.62	0.46-0.76
1998	59	2	3	0.69	0.56-0.81	0.50	0.01-0.99	0.66	0.53-0.77
1999	16	0	0	0.50	0.25-0.75	——	————	0.50	0.25-0.75
2000	46	1	0	0.65	0.50-0.79	1.00	0.03-1.00	0.66	0.51–0.79
2001	65	0	2	0.83	0.72-0.91	——	————	0.82	0.71-0.90
2002	35	0	2	0.54	0.37-0.71	——	————	0.54	0.37–0.71
2003	4	0	0	1.00	0.40-1.00	——	————	1.00	0.40-1.00
2004	52	1	2	0.79	0.65-0.89	0.00	0.00-0.98	0.75	0.61-0.85
2005	30	1	0	0.77	0.58-0.90	0.00	0.00-0.98	0.74	0.55-0.88
2006	3	0	0	0.67	0.09-0.99	——	————	0.67	0.09-0.99
2007	29	0	0	0.76	0.56-0.90	——	————	0.76	0.56-0.90
2008	38	0	2	0.63	0.46-0.78	——	————	0.60	0.43-0.75
2009	2	0	0	0.50	0.01-0.99	——	————	0.50	0.01-0.99
2010	29	0	0	0.41	0.24-0.61	——	————	0.41	0.24-0.61
2011	0	0	0	——	————	——	————	——	————
2012	12	0	0	0.50	0.21-0.79	——	————	0.50	0.21-0.79
2013	3	0	0	0.33	0.01-0.91	——	————	0.33	0.01-0.91
2014	22	0	0	0.55	0.32-0.76	——	————	0.55	0.32-0.76
2015	5	0	0	0.80	0.28-0.99	——	————	0.80	0.28-0.99
Overall:	716	16	21	0.70	0.67-0.73	0.44	0.20-0.70	0.68	0.65-0.72

Appendix G. Estimated mean productivity of female spotted owls on the Oregon Coast Ranges Study Area, 1990-2015. Productivity was defined as the number of young fledged per female. Estimates were calculated for any female for which the number of young fledged was determined before 31 August.

	n			Adults		Subadults		Combined	
Year	Adults	Subadults	Unk	$\bar{x}$	*SE*	$\bar{x}$	*SE*	$\bar{x}$	*SE*
1990	34	4	14	0.94	0.13	0.50	0.29	0.81	0.10
1991	51	2	2	0.18	0.07	0.00	0.00	0.18	0.07
1992	78	7	4	0.85	0.10	0.29	0.29	0.76	0.09
1993	70	0	3	0.17	0.06	——	——	0.19	0.06
1994	95	6	3	0.74	0.09	0.00	0.00	0.68	0.08
1995	91	3	1	0.16	0.05	0.00	0.00	0.16	0.05
1996	93	10	6	1.04	0.09	0.70	0.30	1.00	0.08
1997	109	6	1	0.33	0.06	0.00	0.00	0.32	0.06
1998	100	9	3	0.64	0.08	0.22	0.22	0.59	0.08
1999	99	3	3	0.12	0.04	0.00	0.00	0.12	0.04
2000	97	4	0	0.52	0.08	0.25	0.25	0.50	0.08
2001	87	4	4	1.18	0.10	0.00	0.00	1.15	0.09
2002	75	9	4	0.39	0.08	0.00	0.00	0.34	0.07
2003	80	8	1	0.06	0.03	0.00	0.00	0.06	0.03
2004	86	2	5	0.80	0.09	0.00	0.00	0.77	0.09
2005	74	4	2	0.47	0.09	0.00	0.00	0.44	0.08
2006	63	3	1	0.06	0.04	0.00	0.00	0.06	0.04
2007	63	2	0	0.57	0.10	0.00	0.00	0.55	0.10
2008	56	2	4	0.75	0.12	0.00	0.00	0.68	0.11
2009	46	2	0	0.02	0.02	0.00	0.00	0.02	0.02
2010	45	2	2	0.44	0.11	0.00	0.00	0.43	0.10
2011	21	0	0	0.00	0.00	——	——	0.00	0.00
2012	29	0	1	0.28	0.11	——	——	0.27	0.11
2013	38	0	1	0.03	0.03	——	——	0.03	0.03
2014	34	0	0	0.59	0.15	——	——	0.59	0.15
2015	22	0	1	0.36	0.17	——	——	0.35	0.16
Overall:	1736	92	66	0.49	0.02	0.15	0.05	0.47	0.02

Appendix H. Mean brood size of female spotted owls on the Oregon Coast Ranges Study Area, 1990-2015. Mean brood size was defined as the number of young produced per female that fledged at least one young before 31 August.

	n			Adults		Subadults		Combined	
Year	Adults	Subadults	Unk	$\bar{x}$	*SE*	$\bar{x}$	*SE*	$\bar{x}$	*SE*
1990	24	2	6	1.33	0.10	1.00	0.00	1.31	0.08
1991	6	0	1	1.50	0.22	——	——	1.43	0.20
1992	42	1	0	1.57	0.08	2.00	——	1.58	0.08
1993	8	0	1	1.50	0.19	——	——	1.56	0.18
1994	46	0	1	1.52	0.07	——	——	1.51	0.07
1995	9	0	0	1.67	0.17	——	——	1.67	0.17
1996	62	4	3	1.56	0.06	1.75	0.25	1.58	0.06
1997	26	0	1	1.38	0.10	——	——	1.37	0.09
1998	41	1	0	1.56	0.09	2.00	——	1.57	0.08
1999	8	0	1	1.50	0.19	——	——	1.44	0.18
2000	32	1	0	1.56	0.09	1.00	——	1.55	0.09
2001	59	0	3	1.75	0.06	——	——	1.76	0.06
2002	20	0	1	1.45	0.11	——	——	1.43	0.11
2003	4	0	0	1.25	0.25	——	——	1.25	0.25
2004	44	0	2	1.57	0.08	——	——	1.57	0.07
2005	24	0	0	1.46	0.10	——	——	1.46	0.10
2006	2	0	0	2.00	0.00	——	——	2.00	0.00
2007	24	0	0	1.50	0.10	——	——	1.50	0.10
2008	26	0	0	1.62	0.11	——	——	1.62	0.11
2009	1	0	0	1.00	——	——	——	1.00	——
2010	14	0	1	1.43	0.14	——	——	1.40	0.13
2011	0	0	0	——	——	——	——	——	——
2012	6	0	0	1.33	0.21	——	——	1.33	0.21
2013	1	0	0	1.00	——	——	——	1.00	——
2014	12	0	0	1.67	0.14	——	——	1.67	0.14
2015	4	0	0	2.00	0.00	——	——	2.00	0.00
Overall:	545	9	21	1.55	0.02	1.56	0.18	1.54	0.02